Volunteer Lake Assessment Program Individual Lake Reports

PEA PORRIDGE POND, BIG, MADISON, NH

MORPHOMETRIC DATA

Watershed Area (Ac.):	1,431	**Max. Depth (m):**	13.7	**Flushing Rate (yr^{-1})**	1.5
Surface Area (Ac.):	142	**Mean Depth (m):**	4	**P Retention Coef:**	0.63
Shore Length (m):	3,900	**Volume (m^3):**	2,295,500	**Elevation (ft):**	648

TROPHIC CLASSIFICATION

Year	Trophic class
1979	MESOTROPHIC
2001	OLIGOTROPHIC

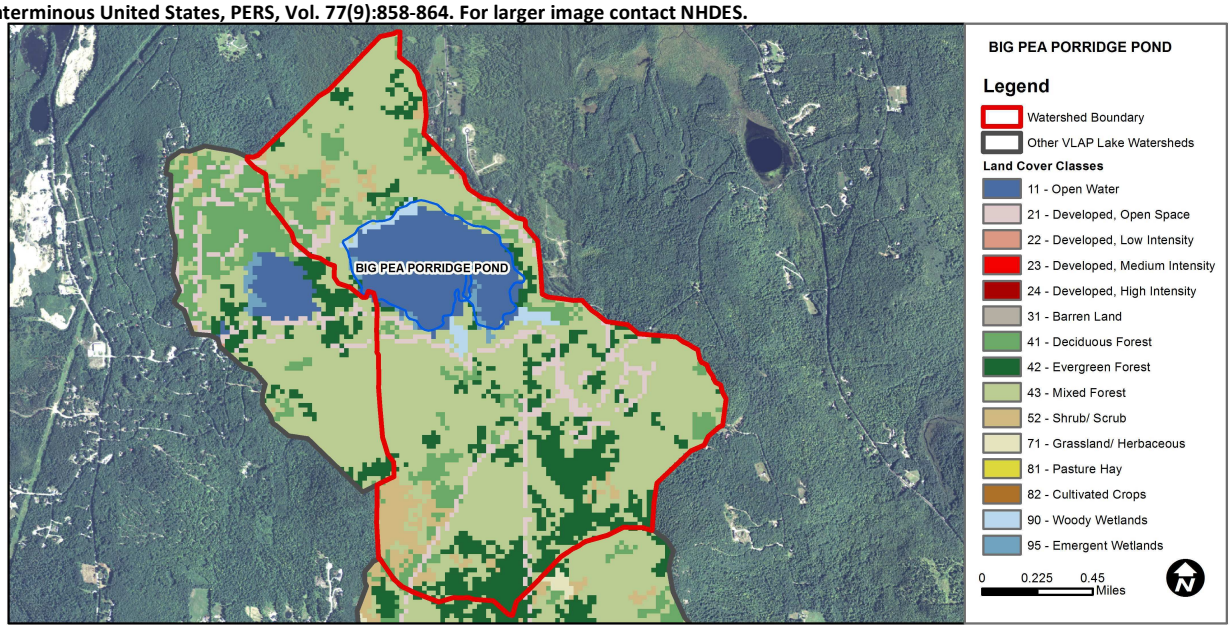
KNOWN EXOTIC SPECIES

The Waterbody Report Card tables are generated from the DRAFT 2014 305(b) report on the status of N.H. waters, and are based on data collected from 2004-2013. Detailed waterbody assessment and report card information can be found at www.des.nh.gov/organizations/divisions/water/wmb/swqa/index.htm

Designated Use	Parameter	Category	Comments
Aquatic Life	Phosphorus (Total)	Good	The calculated median is from 5 or more samples and is < indicator and > 1/2 indicator and the chlorophyll a indicator is okay.
	pH	Slightly Bad	>10% of samples exceed criteria by a small margin (minimum of 2 exceedances).
	Oxygen, Dissolved	Encouraging	There are < 10 samples with 0 exceedances of criteria. More data needed.
	Dissolved oxygen satura	Encouraging	There are < 10 samples with 0 exceedances of criteria. More data needed.
	Chlorophyll-a	Good	The calculated median is from 5 or more samples and is < indicator and > 1/2 indicator.
Primary Contact Recreation	Escherichia coli	Very Good	Where there are no geometric means, all bacteria samples are < 75% of the geometric mean. Where there are geometric means all single bacteria samples are < the SSMC and all geometric means are < geometric mean criteria.
	Chlorophyll-a	Very Good	There are a total of at least 10 samples with 0 exceedances of indicator.

WATERSHED LAND USE SUMMARY

Fry, J., Xian, G., Jin, S., Dewitz, J., Homer, C., Yang, L., Barnes, C., Herold, N., and Wickham, J., 2011. Completion of the 2006 National Land Cover Database for the Conterminous United States, PERS, Vol. 77(9):858-864. For larger image contact NHDES.



Land Cover Category	% Cover	Land Cover Category	% Cover	Land Cover Category	% Cover
Open Water	11.6	Barren Land	0	Grassland/Herbaceous	0
Developed-Open Space	5.48	Deciduous Forest	8.39	Pasture Hay	0
Developed-Low Intensity	0.05	Evergreen Forest	14.52	Cultivated Crops	0
Developed-Medium Intensity	0	Mixed Forest	53.29	Woody Wetlands	1.33
Developed-High Intensity	0	Shrub-Scrub	4.71	Emergent Wetlands	0.66

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Big Pea Porridge Pond, Madison

2014 Data Summary

Observations and Recommendations (*Refer to Table 1 and Historical Deep Spot Data Graphics)*

- **Chlorophyll-a:** Chlorophyll levels were low in June, increased slightly in July, and then decreased in August. Average chlorophyll levels were low, decreased slightly from 2013 and were much less than the state median. Historical trend analysis indicates stable chlorophyll levels since monitoring began.
- **Conductivity/Chloride:** Deep spot and tributary conductivity and chloride levels remained slightly greater than the state medians, but were not above a level of concern. However, historical trend analysis indicates significantly increasing (worsening) epilimnetic (upper water layer) conductivity since monitoring began. Spring chloride monitoring revealed above average chloride levels at #19, #12, #14, #8, #8A, and #9.
- **E. coli:** Shore Beach E. coli levels were very low and much less than the state standard of 88 cts/100 mL. Thusis Beach E. coli levels were low in June and July, but exceeded the state standard for public beaches in August.
- **Total Phosphorus:** Deep spot phosphorus levels were slightly above average in June potentially due to the above average rainfall in May combined with spring turnover. Epilimnetic and Metalimnetic (middle water layer) phosphorus decreased to low levels in July and August. Average epilimnetic phosphorus remained stable from 2013 and was less than the state median. Historical trend analysis indicates relatively stable epilimnetic phosphorus with moderate variability between years. Hypolimnetic (lower water layer) phosphorus decreased to average levels in July and August. Muddy Beach Inlet and Outlet phosphorus levels were low on each sampling event. Big Rock Inlet phosphorus levels were low in June and July and elevated in August. Turbidity was also elevated and laboratory data indicate sediment in the sample and colored water.
- **Transparency:** Transparency measured without the viewscope (NVS) was good in June and increased (improved) slightly in July, then decreased (worsened) in August. Average transparency was stable with 2013 and better than the state median. However, historical trend analysis indicates significantly decreasing (worsening) transparency since monitoring began. Transparency measured with the viewscope (VS) was generally much better than that measured without and likely a better representation of actual conditions.
- **Turbidity:** Epilimnetic turbidity remained average from June to August. Metalimnetic turbidity was slightly above average in July and August likely due to a layer of algae. Hypolimnetic turbidity increased from low to average levels as the summer progressed and organic compounds accumulated in hypolimnetic waters. Muddy Beach Inlet turbidity was within an average range for that station. Big Rock Inlet turbidity was elevated in August potentially due to low flows. Outlet turbidity was average.
- **pH:** Epilimnetic and Metalimnetic pH levels were within the desirable range 6.5-8.0 units, however Hypolimnetic pH was less than desirable. Historical trend analysis indicates stable epilimnetic pH since monitoring began.
- **Recommended Actions:** The worsening epilimnetic conductivity trend is likely a result of winter road salt usage in the watershed. Educate road agents, winter maintenance companies, and homeowners on best practices for road salt application to roads, parking lots, driveways, and walkways. The UNH Technology Transfer Center's Green SnowPro Certification program is a good training opportunity. Visit www.t2.unh.edu/green-snowpro-training-and-certification for more information and educational materials. Overall water quality has remained stable and looks good. Keep up the great work!

NH Water Quality Standards: Numeric criteria for specific parameters. Results exceeding criteria are considered a water quality violation.
Chloride: > 230 mg/L (chronic)
E. coli: > 88 cts/100 mL – public beach
E. coli: > 406 cts/100 mL – surface waters
Turbidity: > 10 NTU above natural level
pH: between 6.5-8.0 (unless naturally occurring)

NH Median Values: Median values for specific parameters generated from historic lake monitoring data.
Alkalinity: 4.9 mg/L
Chlorophyll-a: 4.58 mg/m^3
Conductivity: 40.0 uS/cm
Chloride: 4 mg/L
Total Phosphorus: 12 ug/L
Transparency: 3.2 m
pH: 6.6

Station Name	Table 1. 2014 Average Water Quality Data for BIG PEA PORRIDGE POND									
	Alk. mg/l	Chlor-a ug/l	Chloride mg/l	Cond. uS/cm	E. Coli #/100ml	Total P ug/l	Trans. m		Turb. ntu	pH
							NVS	VS		
Epilimnion	4.83	1.59	8	53.0		7	4.20	4.65	0.98	6.76
Metalimnion				51.8		6			1.19	6.58
Hypolimnion				51.2		12			1.76	6.08
Big Rock Inlet			12	68.7		10			2.24	6.53
Muddy Beach Inlet			8	53.5		7			1.40	6.53
Outlet				53.0		5			0.96	6.66
Shore Beach					4					
Thusis Beach					136					

Station Name	Table 2. BIG PEA PORRIDGE POND CHLORIDE DATA
	Chloride mg/l
#19 Allard Hill Rd	23
#11	9
#12 Porridge Shore Dr	41
#14a Bickford Rd	10
#14 Modock Hill Rd	26
#14b Modock Hill Rd	10
#14c Modock Hill Rd	13
#5 Eidelweiss Causeway	3
#6 Eidelweiss Dr	3
#7 Eidelweiss Dr	3
#8 Brenner Dr	34
#8a Brenner Dr	34
#9 Lizum Place	24
Lot 83 Eidelweiss Dr	10

Historical Water Quality Trend Analysis

Parameter	Trend	Explanation	Parameter	Trend	Explanation
Conductivity	Worsening	Data significantly increasing.	Chlorophyll-a	Stable	Trend not significant; data show low variability.
pH (epilimnion)	Stable	Trend not significant; data show low variability.	Transparency	Worsening	Data significantly decreasing.
			Phosphorus (epilimnion)	Stable	Trend not significant; data moderately variable.